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### **Contributing Factors (CFs) Identified in Produce-Associated Outbreaks, FoodNet, 1999-2002**

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**Background:** FoodNet sites report foodborne outbreaks to CDC's national electronic Foodborne Outbreak Reporting System (eFORS), which provides a standard format for public health investigators to report epidemiologic, laboratory, environmental, and contributing factor (CF) data. CFs provide information on how pathogens contaminate food, how they increase in number or produce toxin, or how mechanisms to reduce or eliminate them failed.

**Methods:** We analyzed 1999-2002 outbreak data from FoodNet sites involving two or more cases in which an epidemiologic investigation implicated the same uncooked fruit, vegetable, salad, or juice to evaluate completeness of CF information and to determine the CFs identified in produce-associated outbreaks with a viral versus bacterial etiology.

**Results:** FoodNet sites reported 890 outbreaks; 469 (53%) had an etiology identified, 365 (41%) had CFs identified, and 457 (51%) had a food implicated. Produce was implicated in 97 (21%) of the 457 outbreaks. Of the produce-associated outbreaks, 63 (66%) had a confirmed or suspected etiology; of these 43 (68%) were due to norovirus and 20 (32%) were due to bacteria.

One or more CFs were reported in 27 (63%) of the 43 produce/norovirus outbreaks, and included handling food by an infected person or pathogen carrier in 18 (42%), bare-handed food contact by a worker in 14 (33%), and inadequate cleaning of processing / preparation equipment / utensils leading to contamination of food in 7 (16%) outbreaks.

One or more CFs were reported in 12 (60%) of the 20 produce/bacterial outbreaks, and included raw product or ingredient contaminated by pathogen from animal or environment in 7 (35%), handling food by an infected person or pathogen carrier in 4 (20%) and process failures that permitted agent survival in 4 (20%).

**Conclusions:** Contributing factors were reported for over 60% of produce-associated norovirus or bacterial outbreaks. For produce-associated norovirus outbreaks, bare-handed food contact and food handling by an infected person are the CFs most often cited. For produce-associated bacterial outbreaks, raw product or ingredient contamination from an animal or environmental source is the most often cited contributing factor.

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